Contribution ID: **504** Type: **not specified**

P4.169 Neutronic analyses of the ITER TBM Port Plug with Dummy TBMs

Thursday, 20 September 2018 11:00 (2 hours)

To achieve the validation and testing of tritium breeding blanket concepts, mock-ups of breeding blankets, called Test-Blanket-Modules (TBMs), are tested in three equatorial ports of the ITER tokamak. Each TBM and its associated shield form a TBM-Set that is mechanically attached to a TBM Frame. A TBM Frame and two TBM-Sets form a TBM port plug (TBM-PP). Actually different TBM versions will be tested sequentially, each one tailored to the specific plasma operation scenario and test objective. In case a TBM-Set is not available, it can be replaced by a Dummy-TBM at any time. TBM Frame and Dummy-TBM are made of stainless steel and also need to meet ITER requirements on shielding, heat removal and safety. The maintenance operations for the TBM-PP include various activities in the Port Cell and in the Hot Cell. In order to assess the requirements, a detailed MCNP model of the TBM-PP, the Pipe-Forest (PF) inside the Port-Interspace (PI) and the Bioshield-Plug (BP) was developed and integrated into the ITER neutronics “C-Model”.
This analysis concerns the neutronic behaviour of the TBM-PP with two Dummy-TBMs by means of activation and shut-down dose rate (SDDR) calculations. The analysis includes the evaluation of the radiation fields in the rooms around the TBM-PP inside the ITER tokamak at several cooling times. Two configurations scenarios have been considered, one with a PF structure inside the PI and one without this structure. The results show that the contribution to the SDDR from the TBM-PP at 12 days after reactor shut down is small compared to the contribution originating from the PF structure. Finally, the required design improvements are proposed in order to reduce neutron flux and SDDR.

The views and opinions expressed herein do not necessarily reflect those of the ITER Organization and does not commit the IO as nuclear operator.

Presenter: LEICHTLE, Dieter (Institute for Neutron Physics and Reactor Technology Karlsruhe Institute of Technology)

Session Classification: P4